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THE ETHANOL BUS FLEET DEMONSTRATION PROGRAM

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ABOUT THE PROGRAM:

The State of Illinois is dedicated to improving air quality in our urban areas, and has begun several efforts to make this possible. These efforts include the testing of ethanol as an alternative to gasoline and diesel in meeting transportation fuel needs of the future. One of these projects is being conducted by the Greater Peoria Mass Transit District (GPMTD). The project consists of 14 ethanol-powered buses which will be operating throughout Peoria and represents the first and largest project test and demonstration of dedicated ethanol engines in urban transit buses in the country.

In October 1988, the Alternative Motors Fuels Act (AMFA) was signed into law in order to encourage the use and production of alternative fuel light-duty vehicles, urban transit buses, and heavy-duty trucks. Also, in 1990, the Clean Air Act (CAA) was passed establishing new emissions standards for all transportation vehicles in this country. The Peoria Ethanol Bus Project is designed as a response to AMFA and CAA by being one of the first programs in America to test the effectiveness of factory produced ethanol engines in meeting emissions standards of the future.

THE VEHICLES:

The Peoria bus fleet is operating 14 dedicated ethanol engines developed by the Detroit Diesel Corporation (DDC). The ethanol engines used in this project are modified versions of conventional DDC 6V-92 diesel engines, which are electronically-controlled, six cylinder, vee-configuration engines that can produce up to 350 horsepower. The changes to the engines include modifications to the electronic control systems, fuel injectors and glow plugs (to make starting easier). Three identical buses with diesel 6V-92 engines are also being operated as control vehicles for the program. The 6V-92 ethanol engines used in the Peoria buses are rated at 253 horsepower, identical to the horsepower produced by the diesel engines. The buses were manufactured by Transportation Manufacturing Corporation (TMC) in Roswell, New Mexico and began arriving in Peoria in early July 1992.

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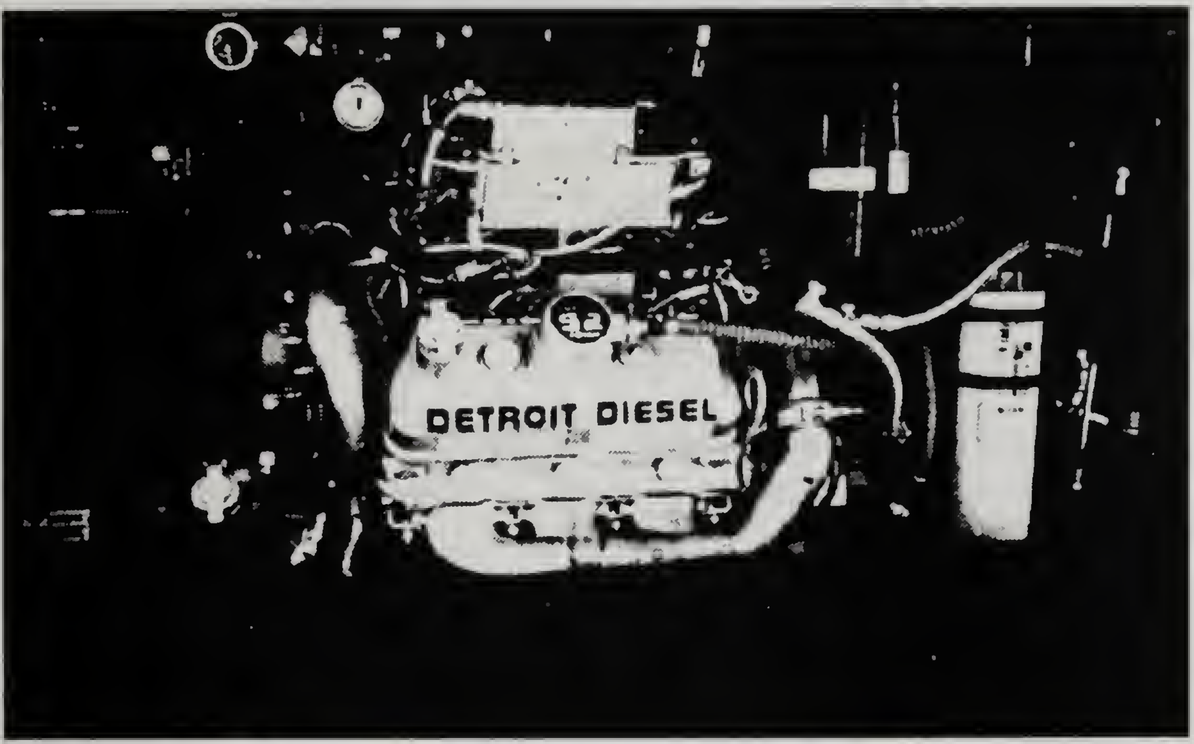

• 6V-92 TA ETHANOL ENGINE EMISSIONS •

Grams/Brake Horsepower-Hour

	Particulates	Hydrocarbons	Carbon Monoxide	Oxides of Nitrogen (NO_X)
1994 EPA Heavy Duty Engine Standard	0.10	1.30	15.50	5.00
6V-92 E95 Engine (After 150,000 Miles)	0.03 0.04	0.20 0.27	0.20 0.76	3.10 3.70
1991 6V-92TA Diesel Engine (#2 Diesel)	0.25	0.50	1.30	4.60

VEHICLE TESTING PROGRAM:

One of the main objectives of this program is to evaluate ethanol's role as an alternative fuel in meeting the vehicle emission standards of the future. Therefore, the buses will undergo complete emissions testing to determine whether the ethanol engines will meet the emission requirements of the Clean Air Act. The U. S. DOE/University of West Virginia Portable Heavy-Duty Chassis Dynamometer facility will perform most of the emissions tests for the program. Emissions from the ethanol engines and a control diesel engine will be monitored for carbon monoxide (CO), carbon dioxide (CO2), nitrogen oxides (NOx), total hydrocarbon, and aldehyde levels. A second objective is to evaluate the performance and reliability of the ethanol engines. An engine teardown for wear analysis will be performed at the end of the program. Bradley University will conduct surveys of the drivers, riders and the general public before and after implementation of the program. The third objective of the program is to evaluate the costs and benefits associated with operating urban transit buses on ethanol fuel.

ETHANOL FUEL:

The United States currently imports about 50% of the petroleum we use for fuel every day. Ethanol is a clean burning, renewable American fuel made from of corn. Corn is a crop grown in abundance in the Midwest—Illinois alone harvests over 1.3 billion bushels each year. Each bushel of corn produces about 2.5 gallons of ethanol, but only the starch from the corn is used to make the ethanol, leaving a high protein livestock feed and other valuable co-products. In addition to ethanol, a bushel of corn yields 1.5 pounds of corn oil, 12.4 pounds of 21% protein feed, 3 pounds of 60% gluten meal, and 17 pounds of carbon dioxide (used for carbonating beverages). Illinois produces about 500 million gallons of ethanol annually, more than any other state in the nation; therefore, it makes sense for us to use our own "homegrown" fuel.

BENEFITS OF ETHANOL TO ILLINOIS:

ENVIRONMENTAL

Unlike the fossil fuels it is replacing, ethanol does not add carbon to the atmosphere, and so does not contribute to the greenhouse effect. Growing corn uses carbon dioxide (CO2) from the atmosphere for photosynthesis and emits oxygen to the atmosphere. Using corn-derived ethanol as a transportation fuel, then, simply recycles the carbon dioxide back into the atmosphere where it started. Furthermore, ethanol is an oxygenate—an octane enhancer which contains oxygen. The extra oxygen present adds to the overall oxygen content of the fuel, causing gasoline blended with 10% ethanol to burn cleaner and emit an average of 20% less carbon monoxide (CO) than does unblended gasoline.

ECONOMIC

The ethanol industry currently has over $1 billion in capital invested in Illinois and provides over 800 industry jobs as well as 4,000 additional jobs in industry related services throughout the state. It has been estimated that 2,200 jobs are created for each 100 million bushes of corn used to produce ethanol. Illinois farmers also benefit from the ethanol industry because it serves as a market for surplus corn and helps support grain prices.

Illinois uses more ethanol to substitute for gasoline than any other state in the nation. Consumer acceptance of gasoline blended with 10% ethanol is steadily growing, and over 30% of all gasoline currently sold in Illinois contains 10% ethanol.

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In addition to the Peoria Ethanol Bus Program, Illinois is also sponsoring demonstrations of an ethanol-fueled heavy-duty truck fleet with ADM in Decatur, and a fleet of 12 ethanol-fueled cars operating in Chicago and Springfield. Other projects are also being planned, all of which will help to evaluate the role of ethanol as a viable alternative transportation fuel for the future.

In testing these ethanol vehicles, Illinois is taking a strong stand in support of a cleaner environment and promoting domestic sources of energy.

SPONSORS:

- Illinois Department of Energy & Natural Resources
- Greater Peoria Mass Transit District
- U.S. Department of Energy
- U.S. Department of Transportation
- Illinois Department of Transportation
- Illinois Central College
- Bradley University
- Illinois Corn Growers Association
- Iowa Corn Growers Association
- Illinois Ethanol Industry
- Detroit Diesel Corporation

FOR MORE INFORMATION ABOUT ETHANOL,
CONTACT THE ILLINOIS DEPARTMENT OF ENERGY AND NATURAL RESOURCES AT
1-800-252-8955 (IN ILLINOIS) OR 217-785-0310 (OUTSIDE ILLINOIS).

FOR TDD CUSTOMERS, DIAL 1-800-526-0844 (ILLINOIS RELAY CENTER) OR (217) 785-0211.

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